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BACTERIAL CONTAMINATION IN DRINKING WATER: ASSESING THE POTABILTY OF WATER

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ABSTRACT

The objective of the study was determining the pot ability of water from some part of Visnupuri area Nanded. The total coliform count in drinking water samples was in the ranges of 140-920 MPN index/100 ml. The data suggested that the quality of drinking water deterioration in rural habitations of this region was due to poor sanitation & contaminated water supply. The occurrence of some pathogenic bacteria in drinking water may increase the risk of water related diseases & health problem in local residents.

KEY WORDS: Bacterial contamination, Drinking Water, Potability of Water.

INTRODUCTION

Water is essential to life. An adequate, safe and assessable supply must be available to all.

Improving access to safe drinking-water can result in significant benefits to health. Every effort should be made to achieve a drinking water quality as safe as possible.

Many people struggle to obtain safe drinking water. A clean and treated water supply to each house may be the norm in Europe and North America, but in developing countries, access to both and clean water and sanitation are not the rule and waterborne infection are common. Two and half billion people cannot assess improved sanitation and more than 1.5 million children die each year from diarrheal disease. According to WHO, the mortality from water associated diseases exceeds 5 million people per year. From these, more than 50 % are microbial intestinal infections, with standing out in the first place.

In general terms, the greatest microbial risks are associated with ingestion of water that is contaminated with human or animal faeces. Wastewater discharges in freshwater and seawaters are the major source of faecal microorganisms, including pathogens.

Acute microbial diarrheal diseases are major public health problems in developing countries.

People affected by diarrheal diseases are those with the lowest financial resources and poorest hygienic facilities. Children under five, primarily in Asian and African countries, are the most affected by microbial diseases transmitted through water.

Microbial waterborne diseases also affect developed countries. In the USA it has been estimated that each countries. In the USA, it has been estimated that each year 560,000 people suffer from severe waterborne diseases and 7.1 million suffer from mild to moderate infections, resulting in estimated 12,000 deaths year. The most important bacterial diseases transmitted trough water is listed in table 1.

Table 1. The main bacterial diseases transmitted through drinking water

Diseases	Disease causing bacterial agents
Cholera	*Vibrio cholerae*, serovarieties O1 and O139
Gastroenterities caused by vibrios	Mainly *Vibrio parahaemolyticus*
Typhoid fever and other serious salmonellosis	*Salmonella enterica* sub sp. *enterica* serover Paratyphi *Salmonella enterica* sub sp. *enterica serovar* Typhi. *Salmonella enterica* sub sp *enterica serover* Typhimurium
Bacillary dysentery or shigellosis	*Shigella dysenteriae* *Shingella flexneri* *Shigella boydii* *Shigell sonnei*
Acute diarrhoeas and gastroenteritis	Escherichia coli, particularly such as O148,O157 and O124

The quality of drinking water may be ascertained by its microbiological examination. The greatest risk from microbes in water is associated with consumption of drinking water that is contaminated with human and animal excreta, although other sources and route of exposure may be significant.

The coliform bacterial group may occur in water due to faecal contamination i.e. discharge of faeces by humans and other animals in water. Coliform include the members of family enterobacteriaceae, E.G. Escherichia coli, enterobacter aerogenes, salmonella & klebsiella. The faecal indicator bacterium (E.coli) has been considered as a bioindicator of faecal contamination of drinking water. The major pathogenic bacteria responsible for bacterial for water-borne diseases are by the faecal oral route, in which water play an intermediate role.

The aim of this study was to check potability of water samples & to check quality of drinking water in respect to microbial contamination. This data may provide some important information about public health risks associated with drinking water quality in this region.

MATERIALS AND METHODS:

The study was conducted in some parts of Vishnupuri (Dam) area. A total of 5 samples from residential tenaments of Visnupuri area were collected & named as W1,W2,W3,W4,W5.

The samples were collected in sterile capped containers to avoid the contamination disposable gloves were worn during water sampling. The water containers & were transported to microbiology laboratory within 6 hours of their collection for the further processing.

The methodology used for whole bacterial analysis included: enumeration, isolation characterization & identification of microorganisms following methods described by Cappuccino (2007) & Aneja (2004).

The coliform detection- A most probable number (MPN) test was used to detect the total coliforms in drinking water samples. MPN was determined by the Mackie & McCarteney (1996) methods. This method is performed sequentially in 3 stages as presumptive, confirmed & completed test.

Lactose broth i.e. doubles strength lactose broth (LB2X) & single strength lactose broth (LB1X) were incubated with different water volumes (10 ml, 1 ml, 0.1 ml) in presumptive test. Tubes that were positive for gas production after 24 hrs incubation at 35 temp were inoculated into BGLBB (Brilliant green lactose bile broth) for confirmed test & positive tubes were used to calculate the most probable number of coliforms in water samples following the statistical table described by MaCkie & McCartney (1996). Completed test involving the inoculation of EMB agar plates, nutrient agar slants & brilliant green lactose broth & preparation of gram stain slide from nutrient agar slants was used to establish that coliform were present in the sample.

Table 2. Coliform count of water samples

Sr. No.	Water samples	MPN index/100ml
1	W1	140
2	W2	180
3	W3	220
4	W4	170
5	W5	920

RESULTS AND DISCUSSION:

As summarised in table 2 drinking water resources were severely contaminated in this region. We recorded 3 important members of the family enterobacteriaceae i.e. E.coli, Enterobacter aero genes & Salmonella.

According to Klein & Casida (1967) coliforms may be used as water quality indicator & if such bacteria are not detected in100 ml water, the water can be said as potable water. As per the described limit of WHO, the drinking water samples were under the category of slightly polluted. The presence of coliform shows the danger of faecal pollution and consequent hazard of contracting disease through pathogenic organisms. The occurrence of bacteria in drinking water samples indicated the mixing of runoff water in water sources. The potential pathogen sources include point sources such as municipal sewerages as well as areas with sanitation through on-site septic systems & latrines.

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